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Software defined cities: A novel paradigm for smart cities through IoT clouds

Merlino G., Bruneo D., Longo F., Puliafito A., Distefano S.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2015 IEEE.A Smart City represents an improvement of today cities that strategically exploits many smart factors to increase the city sustainable growth and strengthen city functions, while ensuring citizen quality of life and health. Cities can be perceived as an ecosystem of "things" which citizens daily interact with: street furniture, public buildings, transportation, monuments, public lighting as well as personal smartphones. Thanks to recent advances in ICT such things can be considered always interconnected also providing sensing and actuating facilities according to the Internet of Things and Cyber Physical Systems models. Creating smart services that exploit such a complex infrastructure is a fundamental and current challenge. To this end, aim of this paper is the design and implementation of the Software Defined Cities approach: a Cloud-based infrastructure that, starting from the well known concept of Software Defined paradigms, is able to transform this complex ecosystem in a simple and "programmable" environment where municipalities, companies, scientists, and citizens can easily collaborate in developing innovative smart services. The overall architecture is presented focusing on both the function virtualization and infrastructure aspects also giving details about the software stacks used (e.g., Open Stack) while a use case is laid out to demonstrate the advantages of the proposed approach.

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Keywords

Cloud, Cyber Physical Systems, Functions Virtualization, Internet of Things, Smart City, Software Defined Ecosystem